

UNITED STATES DISTRICT COURT
SOUTHERN DISTRICT OF OHIO
WESTERN DIVISION

TOM KONDASH, on behalf of himself) Case No. 1:15-cv-506
and all others similarly situated,)
)
Plaintiff,)
v.)
)
KIA MOTORS AMERICA, INC., and) **DECLARATION OF NEIL HANNEMANN**
KIA MOTORS CORPORATION,) **IN SUPPORT OF PLAINTIFF'S MOTION**
) **FOR CLASS CERTIFICATION**
)
Defendants.)

I, Neil Hannemann, declare as follows:

1. I submit this declaration in support of Plaintiffs' Motion for Class Certification.
2. Plaintiffs' counsel asked me to familiarize myself with certain aspects of this case so that I could help explain relevant information to the Court about the automotive industry and the vehicles at issue, including any technical aspects of the vehicles. I was also asked whether I had an opinion about whether or not the spontaneous shattering of panoramic sunroofs in the vehicles is dangerous and whether it appears to be the result of a defect.
3. Based on my education, training and experience, I can provide expert insight into a number of relevant issues. I have also formed the opinions below about the Kia vehicles in this case and their panoramic sunroofs. My opinions are stated to a reasonable degree of engineering certainty.
4. My opinions and analysis are based on my background, experience, education, and training in the field of Automotive Engineering, and on application of recognized laws of physics and principles of mechanical and automotive engineering to the specific issues that are the topics of this declaration, as well as the documents and information listed below.

5. Prior to stating my opinions, here is a brief outline of portions of my education, training and experience with vehicle design analysis that applies to the particular disciplines required to effectively render an opinion in this case.

Background, Qualification and Methodology

6. I received a Bachelor's degree in Mechanical Engineering from General Motors Institute (GMI, now Kettering University) in 1981. At GMI, I was enrolled in the "Automotive Option" curriculum. I was required to write a thesis as part of the degree program at GMI. My thesis was entitled "Design of an Emissions Laboratory." This followed specific course studies in internal combustion engines and engine emissions.

7. My curriculum vitae, which is Attachment A, shows my background in automotive design, design analysis and development engineering and my experience with body systems and glazing. I also have experience with the product creation process within large organizations, including Chrysler. My testimony list for the past 4 years is Attachment B.

8. While employed by a variety of automobile manufacturers I have been responsible for and participated at various levels in the design, analysis, testing and development of almost every vehicle system, including glazing for use in automobiles.

9. I have experience with vehicle recalls at various manufacturers, ranging from responsibility for decisions to perform a recall to root cause analysis of the issue being considered as a recall.

10. As the Chief Engineer of the Ford GT in 2002, I was responsible for determining which process would be best for the windshield and other glazing for the Ford GT. This lead into the supplier selection process. I was involved in a study of the "mid glass", a unique component that was between the driver, the mid-engine location and the rear window. Many different

configurations were considered and I was responsible for approving the final selection for production. Considerations were given to NVH and safety as well as cost, weight, quality, durability and manufacturing feasibility among others.

11. While employed at Aptera in 2008 I had the design and release responsibility for the windshield and glazing. I performed a design analysis study for the use of Lexan polycarbonate for the glazing other than the windshield. This included safety considerations for egress of the vehicle in an emergency.

12. As the Chief Engineer at Saleen, Inc., I was responsible for the windshield and glazing for the Saleen S7. This vehicle was extremely low volume and the manufacturing process for the glazing was also low volume, being made in small batches. This lead to specific quality procedures.

13. As the Program Manager of the Viper GTS/R Lemans racing car I made the decision for making the lightest weight windshields possible. This lead to using different windshield designs for the pre-qualifying, qualifying and race events based on safety and durability.

14. As the Chief Engineer of the Ford GT beginning in 2002 I was responsible for a unique roof design. Not only was the material unique (aluminum rather than steel) the styling featured a relatively large part of the roof formed by the upper surface of the door. This required special attention to the design for safety, strength and function.

15. As a Suspension Design Supervisor at Chrysler Corporation during 1998 I was involved in all aspects of design for steering and suspension systems. I directed a group that was tasked to write an FMEA for suspension system design. I also participated on a team working on an FMEA for a run-flat tire while I was a Chrysler development engineer in 1992. While a Chief

Engineer at Ford Motor Company in 2002 it was my responsibility to decide which components or systems merited an FMEA.

Materials Reviewed

16. I have reviewed the following information and materials:
 - a. Documents produced by Kia
 - b. Published material
 - c. First Amended Complaint
 - d. Documents related to investigations by the National Highway Traffic Safety Administration
 - e. Documents related to the investigation of the Korea Automobile Testing and Research Institute
 - f. Various legal documents
 - g. Deposition testimony

17. I have billed my time at an hourly rate of \$325 for all services in this case.

The Panoramic Sunroofs in this Case

18. My understanding is that the following vehicles are the subject matter of this case:
 - a. 2011-2015 Kia Sorento, Optima, Optima Hybrid, and Sportage; and
 - b. 2014-2015 Kia Cadenza.
19. Each of the Kia vehicles in this case was sold with a panoramic sunroof.¹ Kia appears to refer to this feature as both a “Panorama Roof” (engineering documents) and as a Panoramic Sunroof (marketing and window sticker). For purposes of this declaration both of these terms may be used interchangeably to refer to the same feature. Panoramic sunroofs are a relatively

¹ KMA(NHTSA)00011588

new upgrade option in vehicles sold by a variety of manufacturers. They are considerably larger than traditional sunroofs, usually ranging across the majority of the roof.

20. The panoramic sunroofs share a common design concept, each have either two or three tempered glass panels, which are all 4mm thick.² Each glass panel also has ceramic print on a portion of the glass.³ The panoramic sunroof systems in the Kia vehicles at issue likewise make up a large portion of the total roof area in each vehicle.⁴

21. The panoramic sunroofs in this case are attached to the sunroof frame through seals and reinforcement on the moving glass and an opening and closing mechanism, and the frame is then fastened to the vehicle roof.⁵ In each vehicle, there is one glass panel that is moveable to open and close.⁶ That means that the moving panel needs to create pressure when closed to adequately seal and prevent water intrusion and wind noise as well as reduce exterior noise and operate in a typical vehicle environment. Each panoramic sunroof is also curved.⁷ Coupling curved parts, such as the glass panels to the sunroof frame in these vehicles, always produces an engineering challenge, especially when there are moving elements.

² KMA(NHTSA)00011588

³ KMC00003084

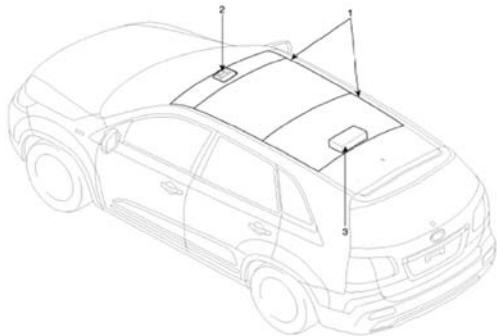
⁴ KMA(NHTSA)00011588

⁵ KMA00012270, KMA00012392, KMA00012426, KMA00012529, KMA00012625, KMA00012741, KMA00012827, KMA00012925, KMA00013039, KMA00013113, KMA00013168, KMA00013279, KMA00013338, KMA00013491, KMA00013596, KMA00013613, KMA00013721, KMA00013797, KMA00013913

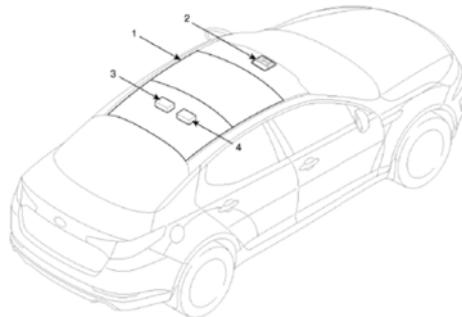
⁶ KMA(NHTSA)00011588

⁷ Kim Deposition 30:3-5

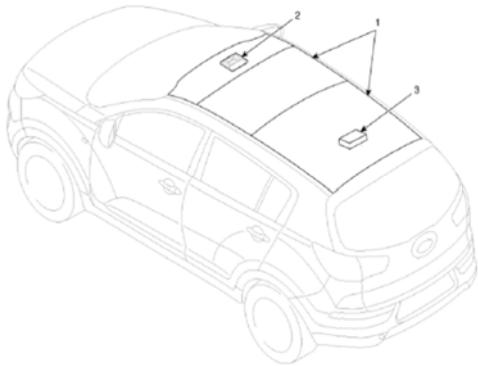
22. Graphics of panoramic sunroofs in the Kia vehicles in this case are below:



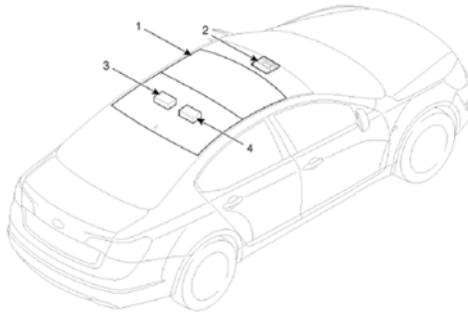
2011 Kia Sorento (XM)⁸



2012 Kia Optima (TF/QF)⁹



2013 Kia Sportage (SL)¹⁰



2015 Kia Cadenza (VG)¹¹

23. The vehicles in this case all have what is called a unibody construction. The loads from the road are transmitted into the unibody as opposed to a body on frame design in which the body is further isolated from the road loads through a separate vehicle frame, which the suspension is mounted to. This means that the roof is a stressed member of both the body and the frame of the vehicle.

⁸ KMA00012360

⁹ KMA00012514

¹⁰ KMA00013022

¹¹ KMA00013582

Failures

24. Automotive design principles require vehicles and their systems and components to be able to withstand the foreseeable challenges the vehicle will face in operation. Some automobile components are wear parts (e.g., tires and brakes), meaning they are designed to wear out over time and are expected to require replacement. Other components may be designed for the “design life” of the vehicle, (i.e., at least 10 years and 160,000 miles as one example that a vehicle manufacturer may use as the design life) but will be expected to require servicing or replacement after that time (components such as wheel bearings, alternators and many other components). Other components, including sunroof glass, are expected to last the life of the vehicle, regardless of mileage or time

25. Panoramic sunroofs must withstand a number of foreseeable conditions and stresses. These vehicles are subjected to a wide temperature spectrum. They also must withstand all forces created by vehicle movement, which includes a wide range of driving conditions, from potholes and speed bumps, cornering, and poor quality roads and freeways. They also must be able to withstand sudden shocks such as a car wash on a hot day to foreseeable impacts such as road debris. The expectation would be that panoramic sunroof glass would not fail due to those types of conditions or stresses, absent a defect.

26. Drivers report that the panoramic sunroofs in the Kia vehicles shatter without warning and outside the context of a collision or some other unexpected event that might be expected to cause the glass to fail. My review of the materials shows a consistent experience: without warning and for no apparent reason, a sunroof panel will shatter. When the panel shatters, it makes a loud noise and pieces of glass may fall on the driver and passengers. In many instances,

the shattering occurs when the vehicles are being driven. Below are pictures of Kia vehicles after the sunroofs shattered:



2012 Kia Sorento¹²

¹² Tab A, Sorento Field Reports, available at <https://static.nhtsa.gov/odi/inv/2014/INRD-EA14002-62406P.pdf>



2011 Kia Sportage¹³

K2518142

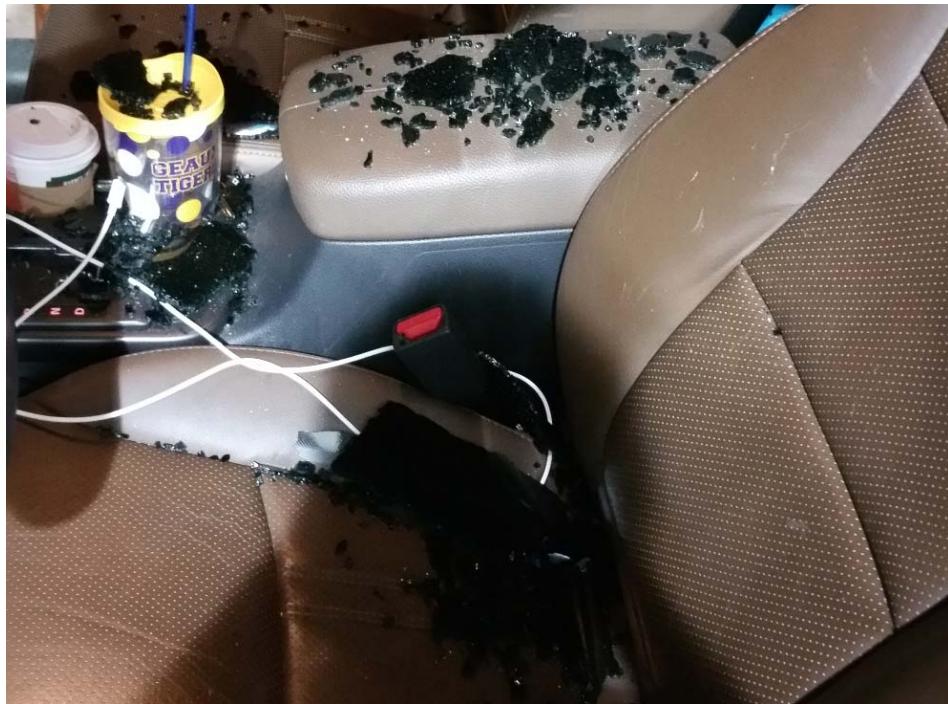


2013 Kia Sorento¹⁴

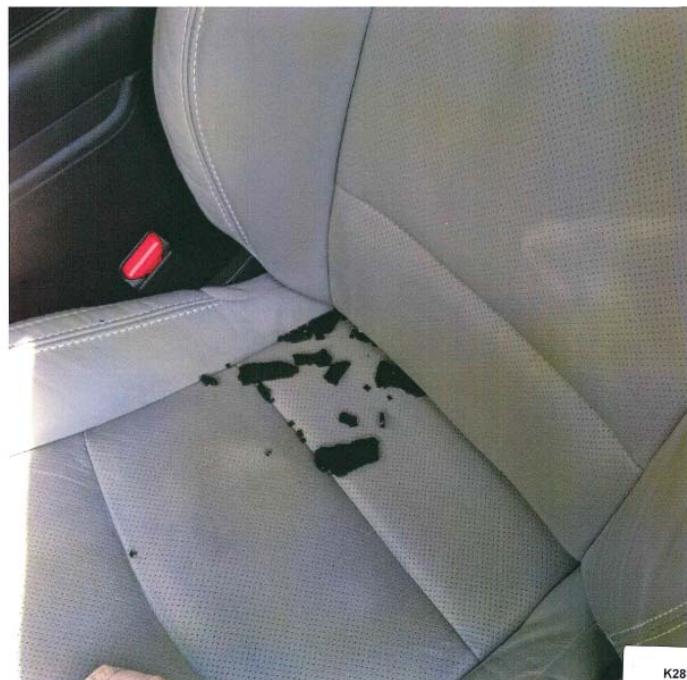
¹³ Tab A, Sportage Consumer Complaints, available at

<https://static.nhtsa.gov/odi/inv/2014/INRD-EA14002-62079P.PDF>

¹⁴ VOQ 10747107, available at <https://static.nhtsa.gov/odi/cmpl/2015/EQ-10747107-7412.pdf>



2012 Kia Sorento¹⁵



2013 Kia Optima¹⁶

¹⁵ VOQ 10689999, available at <https://static.nhtsa.gov/odi/cmpl/2015/EQ-10689999-8246.pdf>

¹⁶ 5-22-2015, Tab A, Optima Part 2, available at <https://static.nhtsa.gov/odi/inv/2014/INRD-EA14002-62081P.PDF>

27. I've worked in and around the automotive industry my entire career, spanning over 40 years and recall few if any instances of a sunroof shattering except where there is a collision or a removable sunroof is dropped.

28. It is common in the automotive industry to estimate the rate of failures by considering how many replacement parts have been sold. I have reviewed data produced by Kia in this case that shows the number of vehicles sold and the number of original equipment replacement panoramic sunroof panels sold. Based on sales data provided to the NHTSA and part sales data provided in this litigation, approximately 2.14 percent of the Kia vehicles in this case have already required a panoramic sunroof glass replacement.¹⁷

Model	Parts Sold	Vehicles Manufactured for Sale	Percentage of Glass Part Sales per Vehicles Sold
2011-2013 Sorento	1,975	65,347	3.02%
2014-2015 Sorento	727	45,666	1.59%
2011-2015 Optima (includes hybrids)	4,914	238,352	2.06%
2011-2015 Sportage	848	38,995	2.17%
2014-2015 Cadenza	308	19,952	1.54%
Overall	8,772	408,312	2.14%

29. These estimated failure rates likely understate the actual rate at which the panoramic sunroofs in the Kia vehicles at issue shatter. For example, the vehicles are in some

¹⁷ KMA(NHTSA)00015587, KMA(NHTSA)00018907, KMA00020018, KMA00018901

instances just a couple of years old, and the oldest among them are from the 2011 model year. These vehicles will be driven for a number of more years.

30. The failure rates I have estimated are higher than I would expect to see in a non-defective sunroof and is higher than would be considered acceptable in the automotive industry (particularly for a failure that poses safety risks as I discuss below). Based on the estimated failure rates, the number of customer complaints, including the drivers' descriptions of what is occurring, and my review of the documents it is my opinion that the panoramic sunroofs in the Kia vehicles at issue are defective.

31. Kia has tracked the problem internally for years. For example, in July 2011, Kia opened a "Priority A" Quality Information Report concerning the Sorento failure after a "catastrophic failure" where a panoramic sunroof shattered, with the report noting that there were at least 11 related reports.¹⁸ Later that year, Kia opened a Quality Information Report after receiving a report of sunroof shattering in the Optima.¹⁹ Kia began to track the issue as part of their "Top Issues Product Quality Report," noting that hundreds of drivers had reported sunroof shattering incidents, including reports from each of the vehicle models in this case.²⁰

32. From my review of documents in this case, it appears to me that Kia is also concerned about the high rate of panoramic sunroof failures in these vehicles.

Safety

33. It is my opinion that the panoramic sunroof shattering in the Kia vehicles in this case is dangerous for drivers and passengers in the vehicles, and also for nearby pedestrians and other drivers.

¹⁸ KMA00014057

¹⁹ KMA00014061

²⁰ KMA00024516

34. Spontaneous or unexpected shattering of a sunroof is likely to startle and distract the drivers. In a letter to Kia, the National Highway Traffic Safety Administration (NHTSA) acknowledged that shattering glass could distract drivers.²¹ It is well known in the automotive industry that driver distraction is dangerous and causes many traffic accidents, injuries, and deaths each year. Perhaps most notorious are accidents that result from drivers taking their eyes away from the road to look at cell phones. Accidents also result from attention being directed to radios, navigation systems, etc. Efforts have been made within the industry to lessen these distractions and to improve safety, for example by promoting the use of “hands free” devices and placing volume and other stereo controls on steering wheels where a driver’s hand is already present during driving. A study by the NHTSA found that “Almost 80 percent of all crashes and 65 percent of all near-crashes involved the driver looking away from the forward roadway just prior to the onset of the conflict. Prior estimates related to “distraction” as a contributing factor have been in the range of 25 percent.”²²

35. Even a brief distraction can be dangerous, as it takes just a short time for a driver to lose control of the vehicle or for an unanticipated object, vehicle, or individual to enter its path. Similarly, drivers may unintentionally swerve, brake, or otherwise drive erratically after being startled.

36. When a panoramic sunroof shatters, drivers describe the sound as being extremely loud and compare it to a gunshot or a vehicle accident. Drivers also say that the glass may fall within the cabin covering the vehicle occupants with glass when the roller blind is retracted. The

²¹ PE 13-035 Closing Resume, available at <https://static.nhtsa.gov/odi/inv/2013/INCLA-PE13035-3034.PDF>

²² Dingus, T. A., et. al., “The 100-car Naturalistic Driving Study, Phase II – Results of the 100-car Field Experiment.”, Report No. DOT HS 810 593, April 2006.

noise is distracting and the subsequent confusion caused by glass will provide further distraction.

The Korean government in its safety investigation quoted the following driver reports:

- “The driver felt very surprised because he suddenly heard explosions like gunfight”
- “The driver was not able to see for a moment because glass pieces fell into vehicle like rain. There were even the case of eye injuries of driver.²³

37. Below I list several firsthand reports from drivers in this case as presented by Kia:

a. 2012 Kia Sportage

1. *He was going between 50 and 60 somewhere around there, second to slowest lane*
2. *It sounded like a shotgun and the sunroof imploded*
3. *My grandson was covered in glass, no injury, just scared to death*
4. *My son was able to get the car in control and get it off the road*
5. *My son called me asked me what I wanted to do*
6. *There was a big shard of glass hanging, 12 to 14 inches long, he had to remove it*
7. *In order to get it out, he bent the arm and drove to Fairfield KIA and they said the service department was closed*
8. *He got back in the car and drove it home to Oakland*
9. *He left the car there and took one of his car and went to the hospital and got a couple of stitches*
10. *My son is 39 years old and this guy can drive*
11. *He was really shaken and really, really upset*
....
1. *I'm not sure which hand, they took a piece of glass out of his eye*
2. *It was in his eye, it wasn't stuck in his eye . . .²⁴*

b. 2013 Kia Optima

3. *My husband was sitting in the passenger seat and his friend was sitting in the back of passenger side*
4. *I didn't have sunroof open but had shade opened since I liked to have sunshine*
5. *All of sudden, nothing hit the sunroof but it exploded!*
6. *There were glass pieces EVERYWHERE!*

²³ Overall Review of CPA (CPA: Ceramic Printed Area), page 6, https://wiki.unece.org/download/attachments/26902754/PSG-02-04_Overall_Review_of_CPA.pptx?api=v2

²⁴ KMA00018374-75

7. *It got into my hair, inside of my clothes, like everywhere*
8. *Little piece of glass got into his friend's right eye*
9. *My husband is in military but medically discharged*
10. *He was in Afghanistan 2 years ago and hit by bomb*
11. *When sunroof glass exploded, he opened the door even though car was still driving on the highway*
12. *I guess it reminded him of his memory in Afghanistan*
13. *The sound was like gun went off or bomb hit it*
14. *It was snowing*
15. *It just happened so quick*
16. *All I remembered was I screamed what the hell was that*
17. *I looked around, saw nothing and when I looked up, sunroof was gone*
18. *My husband was wearing seatbelt*
19. *If he wasn't, he could have jumped out and would be dead*²⁵

c. 2014 Kia Cadenza

18. *I heard a loud boom*
19. *I work at a plant, so I thought there was a small explosion*
20. *Some glass hit me on the head, I don't remember the size*
21. *It was in my hair*
22. *It started raining in and the wind noise was very loud*
23. *I realized what happened, but I couldn't stop on the causeway*
24. *I swerved a little right when this happened; I was shocked; fortunately no one was next to me*
25. *I swerved a little right when it happened; luckily no one was next to me*
26. *I was trying to close the sunshade; small pieces of what I think were glass were falling down around me*
27. *I think I got a piece in my eye, but I washed it out really well with eye drops and have not had any trouble with that*
28. *As soon as I got to the end of the causeway, I called my husband*
29. *We did not call the police*²⁶

d. 2011 Kia Optima

3. *I was in Downingtown, Pennsylvania off of 40 headed towards 202*
4. *Next thing I heard was a boom*
5. *As I'm driving down the road, I looked in my mirror, nothing was there*
6. *I pulled off and veered off to the side*
7. *I scraped the side of the car on the guardrail, it wasn't crushed*
8. *I stood up and it was the biggest hold you ever saw in your life*
9. *I'm trying to explain it to my husband. I'm a nervous wreck*²⁷

²⁵ KMA00014340

²⁶ KMA00014189

²⁷ KMA00015644

e. 2013 Kia Sorento

2. *The customer said that he was driving, the sunroof exploded and he hit a pole as a result and crashed the car*
....
1. *We were just driving*
2. *Then the sunroof exploded and it scared me and I started veering to the sign and hit a street sign*
3. *It started raining so we drove home and when we got home we covered up the sunroof part of the car with plastic*
4. *The next day we looked to see if something had hit the sunroof but we couldn't see any impacts*
5. *We called our ins. co. and made a claim*
6. *The ins. wants us to file this as two separate claims, one for the sunroof and one for the accident*
7. *We don't want to do that though since it was all one incident*
8. *No, we weren't injured*²⁸

f. 2012 Kia Sportage

Customer states:

1. *When I was driving my sunroof exploded*
2. *I was checking that all of the windows were ok*
3. *There was no cause for this to happen to me*
4. *I took it to the service department and they informed me that I would need to contact my*
5. *The paint was also scratched from the glass when the sunroof exploded*
6. *The noise caused me to swerve on the interstate and also caused the car next to me to swerve*
7. *I do not feel that I should pay for the repairs or have it charged to my insurance company*²⁹

g. 2012 Kia Sorento

4. *We went for about a mile and a half on smooth roads*
5. *It of a sudden all came down, so we called the police*
6. *I know people over here fire guns in the air*
7. *So the cops didn't find anything, they told us it was just a flaw in the glass somewhere*
....
1. *All of a sudden this explosion went off*
2. *The next thing I knew [REDACTED] had blood on his face, on my arm*

²⁸ KMA00017409

²⁹ KMA00018157

3. *We were totally submerged in glass*
4. *Everything was covered in glass, it took me 2 days to get the glass out of my hair*
5. *Rich had some really fine cuts on his forehead*
6. *Had it been at nighttime, we were very lucky*³⁰

38. As discussed above, the NHTSA appears to agree that panoramic sunroof shattering is dangerous. In October 2013, the NHTSA opened an investigation into panoramic sunroof shattering in the 2011-2013 Kia Sorento. As part of its opening resume, the NHTSA noted that, “Glass shattering while driving could distract the driver and the resulting glass particles could injure occupants.”³¹

39. Other manufacturers agree with the NHTSA. For example, Kia’s sister company, Hyundai conducted a NHTSA-overseen safety recall in 2012 and 2013 because the panoramic sunroofs could shatter while the vehicles were being driven.³² The NHTSA’s closing resume for the same recall states “Sunroof glass shattering while operating the vehicle poses a risk of personal injury or a vehicle crash.”³³ As part of that recall, Hyundai also advised drivers that:

Hyundai has decided that a defect, which relates to motor vehicle safety, exists in certain model year 2012 Hyundai Veloster vehicles equipped with a panoramic sunroof that were produced during the period beginning on November 1, 2011 through April 17, 2012

....

An investigation by Hyundai has determined that the panoramic sunroof glass in certain Hyundai Veloster vehicles may have been damaged during an automated assembly procedure at its factory. This damage may result in subsequent fracture of the panoramic sunroof glass.

The above condition may cause driver distraction if the panoramic sunroof glass panel were to break while the vehicle is in motion. Additionally, broken safety glass inside the vehicle may pose a risk of minor cutting injury to vehicle

³⁰ KMA00016881

³¹ Opening Resume, PE 13-035

³² Closing Resume, PE 12-027

³³ Closing Resume, PE 12-027

occupants.³⁴

40. Volkswagen conducted a similar safety recall in the fall of 2014.³⁵ In a recall report to the NHTSA, Volkswagen wrote:

Due to a production process issue at the sunroof glass supplier, some vehicles may have been built with a panoramic sunroof glass panel with a steel frame that may have been manufactured out of tolerance. As this manufacturing issue could cause additional stress to the glass panel, the glass panel may be susceptible to breakage if the vehicle experiences a sudden jolt, such as when hitting a large bump or pothole in the road – especially in cold temperatures. Usage of certain de-icing salts also has been identified as a contributing factor. If the glass panel were to break when the vehicle is in motion, it could cause driver distraction, increasing the risk of a crash.

In the recall notice to drivers, Volkswagen wrote that it “has decided that a defect, which relates to motor vehicle safety” exists and that “If the glass panel were to break when the vehicle is in motion, it could cause driver distraction, increasing the risk of a crash.”

41. Based on my experience with automotive design principles, shattered glass in a non-collision event is a dangerous phenomenon to be avoided.

I declare under penalty of perjury of the laws of the United States that the foregoing is true and correct. Executed on July 10, 2017 in Orlando, Florida.

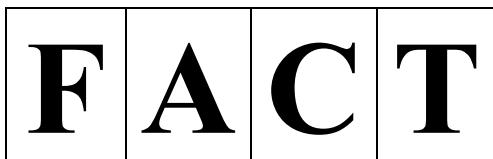


Neil Hannemann

³⁴ Hyundai Owner Notification Letter (Safety Recalls 12V-568 and 13V-051)

³⁵ Volkswagen Owner Notification Letter (Safety Recall 60B9), available at https://static.nhtsa.gov/odi/rcl/2014/RCONL-14V658-3621.pdf?_ga=1.251049089.627498399.1492378133

EXHIBIT 1



FORENSIC AUTOMOTIVE CONSULTING TEAM

1496 Brandon Road, Santa Ynez, CA 93460
Phone 805 693-0404 Fax 805 693- 0504
autofact.org

Neil E. Hannemann
As of June 1th, 2017

TECHNICAL AREAS OF SPECIALIZATION:

Airbag and Restraint Systems	Braking Systems/ABS	Crashworthiness
Defects Investigation	Drivetrain	Driving Expertise
Electric Vehicles	Exhaust System Design and Development	
Hybrid Vehicles	Seat Design and Analysis	Steering Systems
Suspension Systems	SUA/Sudden Unintended Acceleration	
Vehicle Dynamics/ESC	Vehicle Components	Vehicle Fire
Vehicle Rollover	Vehicle Structures	Warnings
Wheel & Tire Design and Development		

EDUCATION:

General Motors Institute - Bachelor of Science - Mechanical Engineering - Automotive option (1982)

SAE: "Selective Catalytic Reduction for Diesel Engines" 2014

SAE: World Congress 2015

PROFESSIONAL EXPERIENCE:

FACT Jan. 1, 2011 - Present
Activities included: Forensic analysis of accident vehicles and accident scenes. Consulting with, and testifying in deposition and trial for attorneys, and government agencies regarding complex automotive litigations. Testing and directing of testing, along with result analysis, of various vehicle components and systems. Testing of vehicle handling and dynamics.

AUTOMOTIVE CONSULTANT

Feb.2007 – Dec. 2010

Activities included: Forensic consulting with and testifying for plaintiff attorneys regarding automotive litigations. Competition Director for the SCCA World Challenge race series. Program Manager for Kepler Motors. Race driver training and coaching, race vehicle engineering, Low volume and “niche” vehicle design, development, analysis and testing and Automotive X-prize proposal development. Consulting for Lockheed in successful defense of a government bid protest.

APTERA MOTORS, INC – Carlsbad, California

March 2008 – Dec. 2008

Senior Vice President – Manufacturing and Program Management: Responsible for all aspects of product development for Aaptera Motors Inc. Major focus is to develop an innovative 3-wheeled electric and hybrid/electric vehicles for consumer use.

MCLAREN AUTOMOTIVE – Woking, England

March 2004 – Jan 2007

Executive Director of Engineering: Responsible for all aspects of engineering and technical integrity for current and future products. Major focus was to be a new mid-engine sports car for Mercedes-Benz. Other programs included new FMVSS 208 compliance (advanced airbag system) for the Mercedes-McLaren SLR and other future variants of the SLR. Also involved in presenting proposals for funding of the mid engine program as a McLaren branded vehicle.

FORD MOTOR COMPANY – Dearborn, Michigan

Jan 2002 – Feb 2004

Chief Engineer: Responsible for Engineering, Design and Development of the new Ford GT. Directed all program planning, supplier selection criteria and organisation of an engineering team of 140 people. Implemented many concepts new to Ford for low volume “niche” vehicle development with timing compressed in an unprecedented manner for typical Ford programs which was the key enabler for accomplishing the program. Directed extensive use of all available computer simulation programs.

SALEEN, INC – Irvine, California

Oct 2000 – Jan 2002

Chief Engineer: Responsible for all Saleen engineering activity including Mustang development, aftermarket parts, and Motor sports. Primary responsibility for the overall program to design, develop and produce the Saleen S7, the latest American Supercar. Implemented a Unigraphics V17 CAD network. Directed design and development of the engine package for the S281E, utilizing an innovative supercharger.

DAIMLERCHRYSLER CORPORATION – Auburn Hills, Michigan

1989 – 2000

NASCAR Winston Cup Program Manager: Assembled and directed an Engineering team that was responsible for the aerodynamic development of the NASCAR Winston Cup Dodge Intrepid, including the design and manufacture of stamped steel race car body panels, fibreglass front and rear fascias and Lexan windshields. Coordinated all technical support for the Chrysler Le Mans sports Car program, both with Reynard and Dallara. Directed CFD aerodynamics simulation for both the Winston Cup and Le Mans programs.

Viper GTS-R Program Manager: Recruited and developed the engineering team, selecting suppliers, and directing assistance from other Chrysler departments (Aero, structures, fabrication shops etc). Selected race teams beginning with the 1996 race season and responsible for most aspects of the race teams. Directed a test team and two engine development companies. This program resulting in 3 LeMans 24 hour wins, 2 FIA Championships, 2 ALMS Championships and an overall win at the Daytona 24-hour race.

Aero- Thermal Development Supervisor: Directed engineers responsible for the aero-thermal development of all Large Car Platform vehicles which included wind tunnel and environmental tunnel testing and on-road verification testing.

Suspension Design Supervisor: Responsible for the design and development of an entirely new suspension for a future model vehicle with the constraint of accommodating an AWD system with an existing FWD under body platform, resulting in a unique Dedion twist axle rear suspension concept. Responsible for developing a new system level DFMEA for Suspension Systems. Staffed a new design group of 11 engineers. Explored alternate material concepts including aluminium. Directed detailed FEA work on the aluminium concepts to address fatigue life concerns, and dynamic structural analysis of the body attachments. Directed vehicle dynamics simulation work using ADAMS.

Vehicle Development Specialist: Responsible for the total vehicle design and development program for a future model vehicle. Lead a small advances planning group, and as the program grew past the advanced stage, I took the design work for all chassis systems.

Product Development Engineer: Responsible for vehicle development of the Viper Platform. Primary responsibility is vehicle dynamics analysis and testing, data acquisition and analysis for all chassis items, including tire testing, aerodynamics development, brakes and suspension. Specific development items have included: Engine oil system development, 3/8 scale model and full scale aerodynamic development for the Viper GTS, developed instrumentation and techniques to correlate wind tunnel data to on – road measurements, shock absorber valving, bias tuning of rear differentials.

CHRYSLER CORPORATION – Santa Fe Springs California 1982 -1989

Product Development Engineer: Located at the Chrysler/Shelby Performance Center at Santa Fe Springs California. Responsible for research and development projects directed by Carroll Shelby as feasibility studies for future Chrysler production vehicles. Directed vehicle testing, including performing all high performance driving, vehicle dynamics analysis, installation of test equipment, and analysis of data. Supervised fabrication and construction of projects and test vehicles. Developed all-wheel drive systems, limited slip differential and a rear disc brake system. Involved in the development of the Chrysler Turbo II engine. Involved in the development of two different turbo 16 valve engine programs. Involved in the initial design phase of the Shelby Can-Am racecar.

MCR TECHNOLOGY (formerly MiniCars Inc.) – Santa Barbara, CA 1981 - 1982

Staff Engineer: Responsible for government safety research projects. Involved in conducting full-scale vehicle crash test and sled tests. Directed vehicle impact tests into highway crash attenuating devices. Directed sled testing to evaluate steering wheel and column safety performance. Involved in a program to develop an airbag landing system for a military target drone.

GENERAL MOTORS – Van Nuys, California 1976 – 1981

General Motors Institute Co-op Student: student project included: Development of the Pontiac 301 cu. In. V8 turbo engine for the 1980 Indy pace car, and validation of a cylinder head swirl flow meter at the General Motors Research Laboratory, Fluid Dynamics Department.

Activities and Accomplishments:

- Speaker at SAE Chapter meetings in Los Angeles, San Francisco, and Detroit.
- Current or past member of SAE, NASCAR, SCCA, IMSA/Sports Car
- Design Judge for Formula SAE competition in 1993, 1994, 2003 and 2007
- Selected as Car Craft Magazine “Hi-Riser” in December 1985
- Speaker at many Viper Owners clubs, GMI alumni and student groups, and many auto race fan clubs.
- Instructor and co-author of the vehicle dynamics section for DaimlerChrysler’s “Vehicle Synthesis Awareness” workshop.
- Keynote Speaker at the 2005 LS Dyna users conference in Birmingham, U.K.
- Speaker at the ImechE conference on Niche Vehicle Development Technology, September 2006.
- Guest Lecturer on Vehicle Dynamics, University of North Dakota, Fargo, April 24, 2017

Motorsports Achievements: (most done on a part time basis in addition to my Chrysler job)

- Executive Team Manager of the ViperSpeed race team which won the 1999 SCCA Speed GT Drivers Championship with Bobby Archer.
- Co-founder of the ViperSpeed race team in 1998
- SCCA World Challenge Driver Champion in 1992, 1994 and 1995 driving an Eagle Talon for Archer Motorsports
- SCCA National Endurance Driver Champion in 1985 driving a Dodge Shelby Charger for team Shelby.
- Engineering consultant for Full Time racing (IMSA GTU), Archer Brothers (Trans Am and World Challenge), and Joe Varde racing (IMSA RS).
- Lead the design and development for racing versions of the Chrysler front wheel drive transaxle. Personally built all the race transaxles used by Joe Varde in IMSA GTU competition.
- Performed engine power development for many race programs. Performed calibration changes for torque management via control of turbocharger boost level.
- Formed and directed Shelby Motorsports in 1987. Shelby Motorsports ran 2 Shelby CSX's in the IMSA International sedan series.
- Endurance co-drivers have included: Jerry Nadeau, Bryan Herta, Dorsey Schroeder, Bobby and Tommy Archer, Bill Saunders, R.K. Smith and John Paul Jr.
- Other racing experience in NASPORT, Ice racing. I have raced in the Daytona 24-hour race 5 times. I have raced at Bathurst in Australia.
- Chrysler representative to the FIA in 1996 and 1997. Saleen representative to the FIA in 2001.

Publications and Presentations:

- SAE paper, "The Role of Vehicle Control Expertise in the Vehicle Development Process"
- SAE paper, "A Study of Steering Assemblies for Evaluation and Rating of Safety Performance".
- Viper Quarterly Magazine, "Vipers racing at Bathurst".
- Ghost-writer for Olivier Berettas' "Lap of LeMans in a Viper" for the LeMans Program publication, 1997.
- "A Study of Steering Assemblies for Evaluation, Rating and Improvements of Safety Performance" DOT HS 806 665; Final Report; Minicars; N. Hannemann, S. Syson; June 1982.
- "Design and Development of a Modified Production Vehicle for Enhanced Crashworthiness and Fuel Economy" Phase I Final report; DTHN22-81-C-07085; N. Hannemann; R. Schwarz; D. Struble; S. Syson; G. Wallace; S. Forest; October, 1982
- "Driving Expertise in the Vehicle Development Process", September 2006, ImechE.

Patents:

- US 8,276,693 B2, October 2, 2012 "Powertrain, Vehicle, and Method with Electric Motors and Dual Belt Drive", N. Hannemann, J. Scarbo, D. Hartland, and R. Wicks

SAE: Professional Development Programs

- "Side Impact Occupant Safety and CAE" July, 2016

EXHIBIT 2

Neil Hannemann				
List of deposition or trial testimony for the past 4 years				
Date	Case	Attorney	Court	
June 18, 2013	Kramer v. Ford	Edgar Heiskell, III	United States District Court District of Minnesota	Deposition
June 20, 2013	Warren v. Ari Makinen Enterprises	Craig Peters	Superior Court of California, County of El Dorado, SC100118	Deposition
June 28, 2013	St. John v. Toyota	Todd Walburg	U.S. District Court, Central District of California, Southern District	Deposition
July 19, 2013	Vance v. Toyota	Edgar Heiskell, III	Circuit Court of Wayne County, Virginia, 12-C-066	Deposition
July 22 & 25, 2013	Uno v. Toyota	Garo Mardirossian	Superior Court of the State of California, Count of Los Angeles	Trial
July 24, 2013	Taylor v. Chrysler	Reagan Sahadi	Superior Court of the State of California, County of Los Angeles, Northwest District LC096532	Deposition
July 31, 2013	Underwood/Stevens v.Kawasaki	Rick Morrison	Circuit Court for the 13th Judicial Circuit of Alabama, Mobile County CV-2010-90031	Deposition
August 8, 2013	Taylor v. Chrysler	Reagan Sahadi	Superior Court of the State of California, County of Los Angeles, Northwest District LC096532	Deposition - 2
August 21 - 22, 2013	Uno v. Toyota	Garo Mardirossian	Superior Court of the State of California, Count of Los Angeles	Trial
August 27, 2013	Bookout/Schwarz v. Toyota	R. Graham Esdale	District Court of Oklahoma County, State of Oklahoma	Deposition
October 15, 2013	Bookout/Schwarz v. Toyota	R .Graham Esdale	District Court of Oklahoma County, State of Oklahoma	Trial
November 8 - 12, 2013	Kleperek v. Ford	John Andrews	Circuit Court of the 13th Judicial of the State of Florida, In and For Hillsborough County, Civil Division	Trial
November 13, 2013	Lacy v. Freightliner	Greg Allen	Circuit Court of Mobile County, Alabama	Deposition
December 10, 2013	Tarango v. Ford	Jon Bailey	District Court of Reeves Co TX, 143 Judicial District, 12-07-20190-CRV	Deposition

December 18, 2013	Rubitsky v. BMW	Roger Dryer	Superior Court of the State of California, County of Sacramento, 34-2011-00113074	Deposition
January 10, 2014	Tarango v. Ford	Jon Bailey	District Court of Reeves Co TX, 143 Judicial District, 12-07-20190-CRV	Trial
April 24, 2014	Quinlan v. Toyota	Ted Leopold	Circuit Court for the 15th Judicial Circuit, Palm Beach Co. FL 50 2012 CA 017172 XXXX MB AI	Deposition
May 1, 2014	Thomas v. Mitsubishi	Todd Tracy	United States District Court, District of Utah, Central Division	Deposition
June 5, 2014	Salud v. Caterpillar	Ted Leopold	U.S. District Court, Southern District of Florida, Miami Division 1:12-cv-23927-PAS	Deposition
June 23 - 24, 2014	Warren v. Ari Makinen Enterprises	Craig Peters	Superior Court of California, County of El Dorado, SC100118	Trial
July 10, 2014	Chang v. Mazda	Jeffrey Asperger	Circuit Court of Cook County 2009 L 003095	Deposition
August 25, 2014	Engheta v. Lamborghini	Corey Arzoumanian	Superior Court of the State of California County of Los Angeles PC 050804	Deposition
October 17, 2014	Lipscomb v. Toyota	Todd Tracy	U. S. District Court for the Western District of Texas, Waco Division	Deposition
November 12, 2014	Mantanona v. Dorel	Todd Tracy	District Court, Coleman County, Texas 42nd Judicial District Court	Deposition
January 12, 2015	Anton v General Motors	Linda Williamson	Superior Court of the State of Arizona, Maricopa County CV2012-017597	Deposition
February 4, 2015	Saylor v. Bob Baker Lexus	Shane Biornstad	Superior Court of the State of California, County of Los Angeles, JCCP 4621	Deposition
March 3, 2015	Engheta v. Lamborghini	Corey Arzoumanian	Superior Court of the State of California County of Los Angeles PC 050804	Deposition
April 7, 2015	Ford v. Paice LLC	Brian Livedalen	U.S. Patent and Trademark Office, IPR 2014-00570, IPR 2014-00571, IPR 2014-00579	Deposition
April 8, 2015	Ford v. Paice LLC	Peter Guarnieri	U.S. Patent and Trademark Office, IPR 2014-00570, IPR 2014-00571, IPR 2014-00579	Deposition
April 30, 2015	Ford v. Paice LLC	Brian Livedalen	U.S. Patent and Trademark Office, IPR 2014-00875	Deposition
April 30, 2015	Ford v. Paice LLC	Brian Livedalen	U.S. Patent and Trademark Office, IPR 2014-00904	Deposition

May 1, 2015	Ford v. Paice LLC	Peter Guarnieri	U.S. Patent and Trademark Office, IPR 2014-00884	Deposition
May 4, 2015	Melendres v. Nissan	Larry Coben	Superior Court of the State of Arizona, Maricopa County CV2011-054249	Deposition
May 5, 2015	Engheta v. Lamborghini	Corey Arzoumanian	Superior Court of the State of California County of Los AngelesPC 050804	Deposition
May 20, 2015	Melendres v. Nissan	Larry Coben	Superior Court of the State of Arizona, Maricopa County CV2011-054249	Deposition
May 21, 2015	Kramer v. Ford	Mary O'Neill	United States District Court District of Minnesota - 12-cv-1149	Deposition
July 17, 2015	Sachs v. Toyota	Gabe Barenfeld	Superior Court of the State of Calif, County of Los Angeles, BC443701	Deposition
July 21-22, 2015	Sachs v. Toyota	Gabe Barenfeld	Superior Court of the State of Calif, County of Los Angeles, BC443701	Trial
August 3, 2015	Jenks v. Toyota	Paul Whelan	Superior Court for the State of Washington, King County	Deposition
February 5, 2016	Nersesyan v. Callaham	Edward Freidberg	American Arbitration Accoc. Commercial Abrition Tribunal - 01-14-0000-3204	Deposition
February 17, 2016	Andrews v. Mazda	Tedra Hobson	U.S. District Court for the Northern District of Geroga, Atlanta Division - 1:14-CV-03432-WSD	Deposition
March 3, 2016	Geronga v.Accubuilt, Inc.	William Smith	Superior Court of the State of California for the County of San Mateo - CIV524896	Deposition
March 24, 2016	Jenks v. Ford	Edgar Heiskill, III	Circuit Court of Floyd County, Virginia	Deposition
April 29, 2016	Nersesyan v. Callaham	Edward Freidberg	American Arbitration Assoc., Commercial Arbitration Tribunal -01-14-0000-3204	Arbitration
May 9 and 10, 2016	Geronga v.Accubuilt, Inc.	William Smith	Superior Court of the State of California for the County of San Mateo - CIV524896	Trial
June 15, 2016	Lawshe v. Mortiz Caddilac	John Stuart Jos	District Court, Tarrant County, Texas 236th Judicial District Court, 236-274469-14	Deposition
August 4, 2016	Kramer v. Ford	Brooke D. Anthony	U.S. District Court for the District of Minnesota 12-1149-SRN/FLN	Trial
September 2, 2016	Looper v. FCA, Chrysler Group	David Stein	U.S. District Court Central District of Calif, Eastern Division 5:14-cv-00700-VAP-DTB	Deposition

October 13, 2016	Swalley v. Plasticolor	Phillip Kuri	Court of Common Pleas of Summit County, Ohio	Deposition
December 7, 2016	Waggoner v. G.M.	Andrew Cook	District Court, Northern District of Texas Witchita Falls Division 7:16-cv 00021-0	Deposition
January 26, 2017	Thomason v. Toyota	Jonathan Altman	U.S. District Court, District of So. Carolina Greenville Division 6:14-cv-04896-BHH	Deposition
February 10, 2017	Woodall v. Hyundai	Andrew Counts	U.S. District Court for the Eastern District of Texas, Sherman Division	Deposition
February 22, 2017	Brewster v. Dorel Juvenile Group, Inc.	Bruce Petway	U.S. District Court for the Northern District of Alabama Middle Division - CV-15-HS-2285-M	Deposition
March 9, 2017	Hillard v. G.M.	Andrew Counts	U.S. District Court for the Eastern District of Texas Tyler Division	Deposition
March 17, 2017	Engheta v. Lamborghini	Corey Arzoumanian	Superior Court of the State of California County of Los Angeles PC 050804	Deposition
May 23, 2017	Cruz v. Nissan	Jerome Tapley	Superior Court of the State of California, for the County of Los Angeles	Deposition

PROOF OF SERVICE

I am employed in the county of Alameda, State of California. I am over the age of 18 and not a party to the within action. My business address is: 505 14th Street, Suite 1110, Oakland, California 94612.

On July 10, 2017, I served a copy of the foregoing document:

DECLARATION OF NEIL HANNEMANN IN SUPPORT OF PLAINTIFF'S MOTION FOR CLASS CERTIFICATION

on the persons below as follows:

Carlos Lazatin
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BY EMAIL: by electronically transmitting a PDF version of above listed documents to the email addresses set forth above on this date.

BY MAIL: by placing the document(s) listed above for collection and mailing following the firm's ordinary business practice in a sealed envelope with postage thereon fully prepaid for deposit in the United States mail at Oakland, California addressed as set forth above.

I declare under penalty of perjury under the laws of the State of California that the above is true and correct.

Executed on July 10, 2017 at Oakland, California.



Alexis Barber